

LESSON 4: Packaging: What a Waste!

LESSON'S CONCEPTS

- Packaging is useful and necessary for many reasons.
- Packaging is a major component of the waste stream. People can reduce the amount of garbage they generate by making thoughtful and informed choices when they buy packaged products.
- Excessive packaging and processing can waste natural resources and increase the amount of solid waste requiring disposal.

PURPOSE

Students will learn the purposes of packaging and how excess packaging contributes to the solid waste requiring disposal.

OVERVIEW

In this lesson students will:

- Determine the purposes of a variety of packaging.
- Identify the materials used in packaging.
- Compare the amount of packaging and costs of the same product when placed in a large package as compared to being packaged in individual containers.
- Work in groups to compare the costs of various potato products that are processed and packaged differently.
- Classify packaging according to categories, based on the purpose or function of the packaging.
- Evaluate wasteful packaging.
- Recognize packaging made from recycled materials.

CORRELATIONS TO CALIFORNIA'S CONTENT STANDARDS AND FRAMEWORKS AND TO BENCHMARKS FOR SCIENCE LITERACY

- Students classify packaging according to categories, based on the purpose or function of the packaging.
 - "There is no perfect design. Designs that are best in one respect (safety or ease of use, for example) may be inferior in other ways (cost or appearance)." (*Benchmarks for Science Literacy*, page 49)

- "Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept . . . Students will: classify objects . . . based on appropriate criteria . . ." (*Science Content Standards, Grades K–12; Grade 5; Investigation and Experimentation, Standard 5a*)
- Students compare the amount of packaging to the size and cost of a product. They also compare the ways potatoes and potato products are packaged.
 - "Students organize, represent, and interpret numerical and categorical data and clearly communicate their findings." (*Mathematics Content Standards for California Public Schools, Kindergarten Through Grade Twelve*, page 18)
 - "Students will: . . . record data using appropriate graphical representation (including charts, graphs, and labeled diagrams), and make inferences based on those data . . ." (*Science Content Standards, Grades K–12; Grade 5; Investigation and Experimentation, Standard 6g*)

SCIENTIFIC THINKING PROCESSES

observing, communicating, comparing, classifying, relating

TIME

30–60 minutes to prepare for the lesson; 45–60 minutes for each of the four sections

VOCABULARY

packaging

PREPARATION

- ___ 1. Read the “Background Information for the Teacher” at the end of this lesson.
- ___ 2. Make a transparency of “Energy for Making a Cardboard Box” (page U2-109).
- ___ 3. Ask students to bring samples of:
 - Nature’s packaging (e.g., bananas, oranges, apples, nuts)
 - Packaging that could be reused (e.g., cottage cheese containers and other plastic containers, plastic bags, paper bags)
 - Packaging that could be recycled (e.g., aluminum and tin cans, foil wrap)
 - Excessive packaging or packaging that is difficult to recycle (e.g., polystyrene from meat trays; individually wrapped packets; packaging combining metal and paper with plastic, such as boxed juices)

Note: Each student should bring only one example of any of the packaging listed in “Preparation” step “2.”

- ___ 4. Make copies of “Purpose or Function of Packaging” for each group of three or four students (pages U2-110 and U2-111).

- ___ 5. Obtain a large bag of potato chips and the same amount of potato chips (by weight) in small individual packages (the same brand of chips should be bought for accurate cost comparisons). Keep receipts for cost comparisons.

Note: If small individual packages of potato chips are not available, use another product (e.g., crackers or cookies) that come in a large bag/box and in individually packaged bags/boxes.

- ___ 6. Purchase five food items packaged in the following ways and label “A,” “B,” “C,” “D,” and “E”:
 - A. A product in a plastic container (e.g., yogurt)
 - B. A product in packaging made from recycled material (e.g., cereal in a cardboard box)
 - C. An apple, banana, or other fruit
 - D. A product in an aluminum can (e.g., soda)
 - E. A product which has eye-catching and excessive packaging, wrapped in more than one layer so that the product appears larger (e.g., fancy cookies, candy, or a toy)
- ___ 7. Make a transparency of “A Spud by Any Other Name 1” (page U2-112). If

(Use school’s letterhead.)

Dear Parent or Guardian,

Please read the following information with your child:

Our class is studying packaging. Students will analyze why products are packaged and which products appear to be overpackaged (and therefore add to our solid waste). Would you please collect and send with your child one example of any of the following food packaging:

- Nature’s packaging (for example, banana, orange, apple, nut)
- Packaging that could be reused (for example, cottage cheese container and other plastic containers, plastic bags, paper bags)
- Packaging that could be recycled (for example, aluminum and tin cans, foil wrap)
- Excessive packaging or packaging that is difficult to recycle (for example, polystyrene from meat trays; individually wrapped packets; packaging combining metal and paper with plastic, such as boxed juices).

Please rinse these packages, if needed, and have your child bring them to class on _____.

Your cooperation in this matter is greatly appreciated.

Thank you,

you want your students to complete the calculations in the price and pound column, make a copy of “A Spud by Any Other Name 2,” for each group of students (page U2–113).

- 8. Make a copy of “Analyzing the Cost and Packaging of a Product” for each group of two or three students (page U2–114).

MATERIALS

For “Pre-Activity Questions”

- The transparency, “Energy for Making a Cardboard Box”

For “Part I, Looking at the Purpose or Function of Packaging”

- Samples of different types of food packaging (e.g., paper boxes, metal cans, plastic bottles and bags, glass containers, foil wrappings, polystyrene trays) brought by students
- A copy of the chart, “Purpose or Function of Packaging,” for each group of three or four students

For “Part II, Comparing the Size of the Package to the Amount of the Product”

- Weight scale
- A large bag of potato chips and the same amount of potato chips in small individual packages (or other products that come in a large bag and in small individual packages)

Note: If students are planning to eat the potato chips, provide a bowl in which the chips can be placed before the empty bags are weighed. If students will be handling the chips to weigh them, provide plastic gloves for students who will be handling them to keep the chips from getting contaminated.

For “Part III, Analyzing Ways Potatoes and Potato Products Are Packaged”

- A transparency of “A Spud by Any Other Name 1” (If students will be calculating costs, then make a copy of “A Spud by Any Other Name 2” for each group of three or four students.)
- Calculator (if using “A Spud by Any Other Name 2”) for each group of three or four students
- The chart, “Analyzing the Cost and Packaging of a Product,” for each group of two or three students

PRE-ACTIVITY QUESTIONS

A. Ask students:

- What products usually come in packages? *Many food items, cosmetics, toys.*
- What products usually do not come in packages? *Clothing, fruits and vegetables, books.*

B. Tell students that in this lesson, they will focus on the packaging of food items. Ask students:

- What types of food come in packages; i.e., packaging that people make? *Canned foods; frozen foods; perishable foods; drinks; snacks, like potato chips.*
- What types of food usually do not come in packages? *Fresh produce, items sold in bulk (in barrels or bins).*

C. Ask students to identify food items that are packaged in the following ways:

- Paper or cardboard; e.g., *cookies, cereal, eggs, cubed butter*
- Plastic; e.g., *noodles, salad mixes, candy, catsup*
- Aluminum; e.g., *soft drinks, other drinks*
- Steel/tin; e.g., *soup, canned vegetables, pet food*
- Glass; e.g., *fruit juice, vegetable oil, mayonnaise*
- Mixed materials; e.g., *boxed fruit juices, pet food in a bag*

D. Discuss which categories of natural resources were used to produce the packaging. For example:



Students from Janet Cohen’s sixth-grade class at Gold Trail Elementary School look at various types of packaging.

- Paper or cardboard; *trees (plants)*
- Plastic; *fossil fuels (energy sources)*
- Aluminum; *minerals*
- Steel/tin; *minerals*
- Glass; *minerals*
- Mixed materials; *more than one natural resource, such as trees and fossil fuels*

- E. Show the transparency of “Energy for Making a Cardboard Box.” Ask students to explain how energy is used to produce packaging. *To grow trees; to harvest trees; to obtain petroleum for energy, for transporting trees and the processed materials; to provide electricity to operate the lumber mill, manufacturing plant, packaging business, and store.*

PROCEDURE

Part I, Looking at the Purpose or Function of Packaging

In this activity students determine why food products are packaged a certain way.

- A. Introduce the activity by passing around samples of different types of food packaging which the students brought to class. Ask students to identify the purpose or functions of food packaging. That is, why is the product packaged in that way? Develop a class list. For example, the purpose or function of the package is for:

- Preservation of product: to keep food fresh
- Protection of product: to keep the contents from damage during shipping
- Sanitation: to keep the item clean and uncontaminated
- Consumer safety: to prevent tampering (e.g., having someone add something harmful to the product)
- Complying with regulatory standards imposed by government regulations
- Identification of product: to identify the product inside the package
- Theft protection: to prevent the item from getting stolen
- Provision of instructions: To provide instruction on how to use or prepare the item in the package



Students from Nona Reimer’s fifth-grade class at John Malcom Elementary look at various types of packaging.

- Convenience: to make it easier to carry home; to keep small items together
 - Advertising: to make you want to buy it
- B. Collect the packaging that students brought.
- C. Divide the class into five groups and provide each group with the chart, “Purpose or Function of Packaging,” and one food package.
- As the groups complete their charts for one item, allow them to pass their packages to other groups so that each group analyzes a total of five packages.
 - Ask students to complete “Part I” on their chart, “Purpose or Function of Packaging.”
 - Have students report what they learned.
 - Discuss with students:
 - From what materials were various packaging made? *Plastic, paper, aluminum.*
 - Which packaging seems most important? *The one for the preservation and protection of the product.* (Answers will vary.) Have students offer explanations for their answers.
 - Which product has the most packaging?
 - Is there any packaging that is making the item seem bigger and more eye-catching? If so, why was the item packaged in that way? *To make you want to buy the product.*

- Did any packaging appear unnecessary or excessive? Have students offer explanations.
- Why is excessive packaging a problem? *It uses up too many raw materials and usually gets placed in a landfill after one use.*
- Of the packaging that was most excessive, what materials and natural resources were used in making the packaging? *Cardboard (trees), plastic (fossil fuels).*
- How could the packaging have been made in order to conserve natural resources? *Less packaging used; packaging made from recycled materials; packaging that could be recycled.*
- What do people usually do with the packaging after they use the product? *They throw it into a garbage can. Sometimes they throw it on the ground and it becomes litter.*
- Where does packaging go when it is thrown in a garbage can? *To the landfill.*

- Can something else be done with the packaging? *Some packaging might be reused or recycled.*
- What could be recycled? (The answer will depend on what is currently accepted for recycling in your community.) *Aluminum cans, glass jars, plastic bottles.*
- What packaging was made from recycled products? How do we know that a package is made from recycled products? (These packages usually have the standard recycling logo with the three arrows printed on the package.) Why is it a good idea to buy packages made from recycled products? *This conserves natural resources because fewer raw materials were probably needed to make the recycled products.*

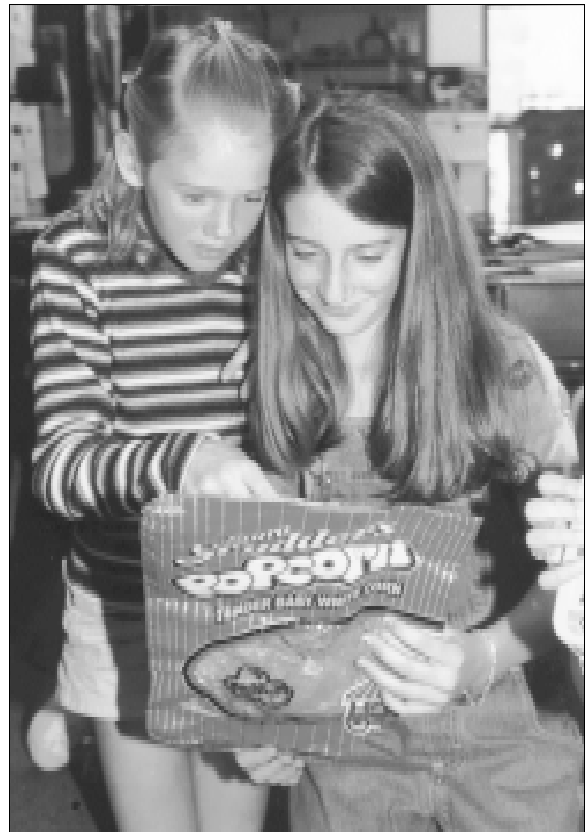
**CARTON MADE FROM
100% RECYCLED PAPER**



MINIMUM 35% POST-CONSUMER CONTENT



A student from Valley Oak Elementary School examines a package.



Two students from Nona Reimer's fifth-grade class at John Malcom Elementary School examine a package.

Note: The goal of this activity is to learn what students understand at this point about what is desirable or necessary, undesirable or unnecessary, concerning packaging. Depending on the students' answers, you may wish to continue the discussion, especially if your school has begun a reducing, reusing, and recycling program or if students live in communities where there are recycling programs already underway.

D. Ask students to complete "Part II" in the "Purpose or Function of Packaging." Have groups report back to the class. Discuss with students:

- Which packages can be reused or recycled?
- How can we reuse the packaging?
- What will happen to the packaging we cannot reuse or recycle?

E. Ask students to complete "Part III" in the "Purpose or Function of Packaging." Conduct a discussion of their ideas.

F. Ask students whether they think the amount and type of packaging affect the cost of different food products. What percent of the cost of packaged foods do they think is due to packaging? Record students' guesses. Tell students that packaging can often add about 10 percent more to the cost of the product. This means that for every dollar (or 100 cents) they spend, 10 cents goes to packaging.

G. Discuss the following with students:

- What are the advantages of packaging?
- How can packaging actually reduce the volume of waste of the items inside the packaging? *By reducing spoilage and damage of these items.*
- Is packaging necessary for all types of food? Have students explain their answers.
- Which packaging is least wasteful of natural resources? Which is most wasteful? What criteria might you consider when deciding whether packaging is necessary or wasteful?
- Which of your favorite foods could you buy without packaging?
- What should we do with the packaging that everyone brought to class? (Some of it can be used in "Application.")

Note: You might want to keep the packaging for arts and crafts projects and/or for Lesson 10.

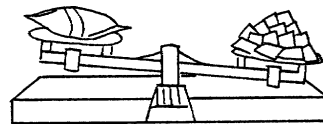
Part II, Comparing the Size of the Package to the Amount of the Product

In this activity students compare the sizes of the packages containing the same type of product, potato chips.

A. Show students a large bag of potato chips and the same amount of potato chips in small individual packages.

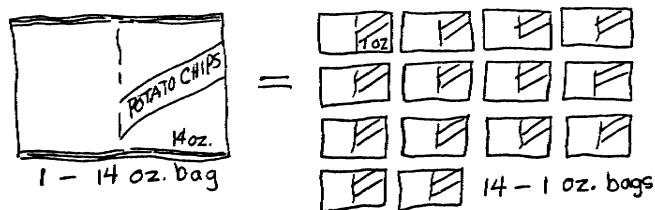
Note: If students are planning to eat the potato chips, the chips can be placed in a bowl as the bags are weighed. If students will be handling the chips to weigh them, have them use plastic gloves to handle the chips to keep them from getting contaminated.

1. Have students weigh the large bag of chips and the empty bag. Record both weights. Show students that they can subtract the weight of the bag from the total weight of the bag and chips to get the weight of the chips. (This information should also be on the package.) Students might want to check their subtraction figures and the accuracy of the weight indicated on the bag by weighing the contents of the bags.
2. Weigh all of the small individual bags with the chips and then only the bags. Record the weights. Show students that they can subtract the weight of all the bags from the total weight of the bags and chips to get the weight of the chips. They can also use the weight information of the bag. If students want, they can check their subtraction figures and the accuracy of the weight indicated on the bags by weighing the contents of all the small bags.



3. Have students compare the weight of the large bag to the weight of all the small bags.
4. Ask students to cut the bags and spread out the packaging paper to compare the amount of paper used for the large bag to the total amount of paper used for the small bags. Include the large bag or box

in which the little bags came. This could be placed on a bulletin board for visual effect.



Note: Older students could calculate the area of the wrapper. To determine the area, students will need to measure and multiply the length times the width of the wrapper. So if the wrapper measured six inches by eight inches, the area would be 48 square inches.

5. Discuss with students:

- Which products could be bought in bulk or in large containers? *Fruits and vegetables, breakfast cereal, rice, beans, candy.*
- What are the advantages of buying items in large quantities (or in bulk)? *The item is less expensive per serving, and there is less packaging that goes to the landfill or that needs to be recycled.*

Homework Assignment: Ask students to work in groups to create a display to show the packaging of a selected product. For example, a group can compare the amount of packaging of an



A comparison of weights of single-serving boxes to a multiple serving box is displayed at the Davis Street Educational Center, San Leandro, California; operated by Waste Management, Inc.

economy-sized cereal box to several small individual-sized cereal boxes. They will need to get enough small boxes so that their total amount of cereal will equal the amount in the large box.

6. Ask students to guess how much of our trash is packaging. Tell them that it makes up to 40 percent of household garbage. Have students determine a way to graphically show 40 percent. This can be done using a graph or chart.



Students from Janet Cohen's sixth-grade class at Gold Trail Elementary School compare the weight of a large potato chip bag to small individual packages containing the same amount of potato chips.

7. Ask students what types of packaging the potato chips are in that they bring to school. Discuss other options for packaging these chips to create less waste. *Reuse the plastic bags; use reusable plastic containers.*

Part III, Analyzing Ways Potatoes and Potato Products Are Packaged

In this activity, students compare the packaging of the same type of product that is processed in different ways (e.g., fresh potatoes, instant mashed potatoes, canned potatoes).

- A. Decide to do “Option 1” and “Option 2” if you want students to calculate the price per pound. Do “Option 2” only if you do not want students to do the calculations.

Option 1: If you want students to calculate the price per pound, provide a calculator and a copy of “A Spud by Any Other Name 2” to each group. Complete several calculations as a class until students understand how to do these calculations. Then ask the groups to complete the calculations for the rest of the products.

Option 2: If you do not want your students to calculate the price per pound (or if students have completed the calculations), project the chart “A Spud by Any Other Name 1” on an overhead projector and ask the following questions:

- Which forms of the potato seem to be most highly processed?
 - Which forms are most expensive per pound?
 - Which form of potato would you purchase if you were interested in reducing solid waste?
 - Which form of potato would you purchase if you were interested in saving money?
 - What relationships are there among cost, amount of processing, and packaging of products?
- B. Ask students if packaging is necessary for all types of food. Encourage students to explain their answers.
 - C. If possible, take students to a grocery store. Otherwise, have students complete this assignment as homework. The chart may need to be adjusted if your community has small grocery stores.

- Divide students into groups of two or three.
- Instruct each group to choose a fresh food item to investigate, such as apples, peanuts, tomatoes, or corn.
- Provide the chart, “Analyzing the Cost and Packaging of a Product,” for each group.
- Ask students to complete their charts for the fresh form of their product and for five different processed forms of the product (e.g., frozen, canned, whole, canned cut, creamed or pureed, dehydrated).
 - One way to do this is for group members to assign specific types of products for each student to research. If this approach is used, you will need to provide each student with a copy of the chart.
 - Another way to do this is for one student to volunteer to do the entire chart and bring it to class. The rest of the group members can then complete the calculations.

Note: Students should try to get the same type of weight measurements for easy comparison. You might need to explain to students that there are 16 ounces in one pound and encourage them to convert all products on their charts into ounces or pounds.

- D. Have students within their groups consolidate their data on one group chart and present the results to the class.
- E. After all groups have collected their data, conduct a whole class discussion, addressing the following questions:
 - Which form of your food item is most expensive per pound? Why? Which form do you think takes the most energy to produce? (The concept of energy was introduced in the 4–6 Module, Unit 2, Lesson 2.)
 - What relationships are there among cost, amount of processing, and packaging of products?
 - Which of these products will you buy in the future?
 - What criteria will you use for making your decisions about what to buy and what not to buy?

DISCUSSION/QUESTIONS

- A. Ask students how they can reduce the amount of packaging they throw away. *Buy items with less packaging; buy items in packaging that can be recycled.*
- B. Discuss the importance of packaging. Review the class list developed in “Part I” on the purposes of packaging. Then discuss the drawbacks or trade-offs of packaging. Make a class list of some drawbacks or trade-offs. For example:
- Packaging increases the cost of the product.
 - Most packaging ends up in a landfill.
 - Some packaging becomes litter and makes an area ugly and can injure people and wildlife.
 - Packaging can make a product look bigger and better than it really is.
 - Natural resources are used to make packaging.

APPLICATION

Homework Assignment: Ask students to record the type and amount of packaging that is thrown away or recycled for one week. One way to do this is to have students collect clean packaging in a separate cardboard box for one week and then record what was collected. Or, the students can peek in their garbage cans at the end of the day and record what they see. Students should also describe ways they can decrease the amount of packaging that is being thrown away or recycled at home.

- A. Ask students to share their homework assignments.
- B. Write the following on the chalkboard, but in a different order from the one below. Have students rate the following in order of least wasteful to most wasteful and explain their answers:
- No packaging
 - Refillable (or reusable) packaging made from recycled products
 - Packaging that is reusable
 - Packaging made from recycled products and is recyclable
 - Packaging that is made from recycled products

- Amount of packaging limited to one layer
- C. Have students in each group select one type of cookie they want to package. Students should decide what the purpose of the package should be. Then ask them to describe and draw the package and possibly make it. (Some packaging from “Part I” could be used.) Remind students to design packages which reflect their awareness of the importance of waste reduction.
- D. Ask students to:
- Identify two environmental and/or waste management problems associated with packaging. *Litter and need for disposal*
 - Design a list of recommendations for selecting and purchasing food products: For example:
 - Choose products in recyclable, returnable, or refillable containers.
 - Avoid excessive packaging (For example, avoid items that are packaged in plastic bubble wrap.)
 - Buy products in bulk and in larger sizes.
 - Buy unwrapped fruits and vegetables.
 - Avoid snack items in single-serving packages.
 - Support companies that provide minimal packaging and use packages made from recycled products.
 - Carry products home in cloth or string bags.
- E. Ask students what action would be most responsible from the standpoint of reducing solid waste if they were asked at a grocery store whether they wanted paper or plastic bags. Students should be aware that bringing their own cloth or string bags is the best option. If a cloth bag is not available, students should consider that paper comes from renewable natural resources and plastic from nonrenewable natural resources. A paper bag can be reused several times and then recycled. However, a plastic bag could also be selected if a household reuses the plastic bag several times before recycling it, or uses it to line kitchen garbage cans (instead of buying new plastic bags).

- F. Ask students to write in their journals how they could reduce the amount of packaging used with the items that they purchase.

How could you reduce the amount of packaging you use?
I can buy things that are not packed in 2 or 3 layers of plastic or any other material. I can also not buy a few little things of the same kind and instead buy one big thing.

Submitted by Janet Cohen, sixth-grade teacher, Gold Trail Elementary School, Gold Trail Union School District.

EXTENSIONS

- A. Ask students to rank/order the food products investigated from “most packaging/processing” to “least packaging/processing” and construct a graph illustrating the relationship between cost and packaging. Then ask them to interpret and describe the graphed relationship in one to two sentences.
- B. Assign students to prepare a personal plan for reducing the amount of excess packaging used with the items that they purchase.
- C. Ask students to notice, at the grocery store, which brands of products seem most overpackaged. As a problem-solving activity, ask students to brainstorm ways they can convey their findings to companies that use excessive packaging. How can students address the issue as a mutual problem? What are likely to be the most effective ways to communicate? Assign students to test their ideas.
- D. Have students analyze packaging of fast food restaurants. Ask them to identify how much packaging was used and whether the packaging is recyclable or reusable. If the packaging is reusable, how can it be reused? Encourage students to creatively reuse the packaging and bring their creations to class.
- E. Have students analyze the following: If you buy things in larger containers, does it reduce waste? Students can compare six 6-oz. juice bottles to a 36 oz. juice bottle. Allow students to drink the juice and compare the amount and weight of the containers.
- F. Have students conduct a survey in school lunchrooms or at snack booths. Find out why students buy a product. Did they consider how much product they actually bought and how much of what they bought (including packaging) ended up being thrown away?

RESOURCES

Videos

Recycling Is Fun. Oley, Pa.: Bullfrog Films, 1991 (12 minutes).

Three children explore the three Rs of recycling—reduce, recycle, reuse. To educate themselves, they visit a landfill, a recycling center, and their local supermarket to find out what they can do to help to manage solid waste. While visiting the grocery store, the children look for new products made from, or packaged in, recycled paper or plastic containers. They discover their own power to recycle and choose what they buy. For grades K–4.

Garbage Tale: An Environmental Adventure. Los Angeles, Churchill Films, 1990 (18 minutes).

A boy dreams that he visits a landfill and recycling center and learns about reducing, reusing, and recycling. Shows that one bag of groceries can create three bags of waste.

Books

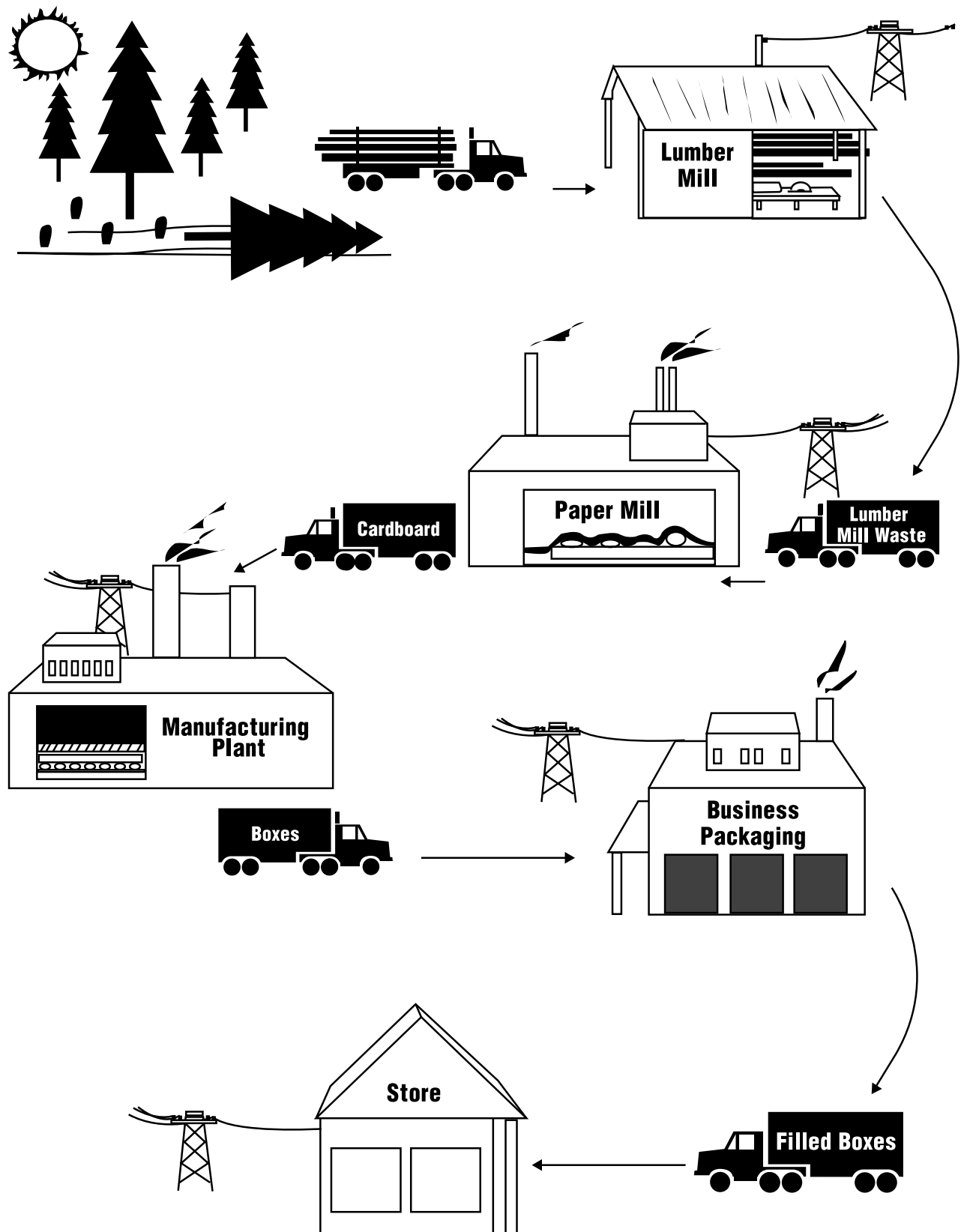
Kalman, Bobbie. *Reducing, Reusing, and Recycling.* The Crabtree Environment series. New York: Crabtree Publishing Company, 1991.

Describes the three Rs and how to become a wise consumer.

Harlow, Rosie, and Sally Morgan. *Garbage and Recycling.* Young Discoverers series. New York: Larousse Kingfisher Chambers, Inc., 1995.

Provides information about reusing, recycling, packaging, litter, and worms. Recommends activities for students to learn more about the solid waste problem and how to help solve it.

ENERGY FOR MAKING A CARDBOARD BOX



Name: _____ Date: _____

PURPOSE OR FUNCTION OF PACKAGING

Part I. Write the name of each item for which you are analyzing the package. Check off the function or reasons for the packaging. Then check whether the amount of packaging is necessary (#12) or whether the product appears to be overpackaged (#13).

Name of item	Function of or reason for the packaging												
	1. Preservation of product	2. Protection of product	3. Sanitation	4. Consumer safety	5. Complying with regulatory standards	6. Identification of product	7. Theft protection	8. Provision of instructions on how to use product	9. Convenience	10. Advertising	11. Other _____	12. Amount of packaging seems necessary	13. Appears to be over-packaged
A _____													
B _____													
C _____													
D _____													
E _____													

Part II. Which of the items (listed under A, B, C, D, and E above) are packaged in:

A. Natural packaging (no paper, plastic, or other human-made materials)?

B. Reusable packaging?

C. Recyclable packaging (packaging that can be recycled)?

D. Nonrecyclable packaging?

E. Packaging made from recycled materials?

Part III. Select one of the products and its packaging. Describe another way that this product could have been packaged. You can illustrate your newly designed package.

A SPUD BY ANY OTHER NAME 1

Product	Package size	Price	Price/pound (lb.) ¹	How packaged
Fresh russet potatoes	5 lb.	\$.99	\$ 0.20	Plastic bag
Fresh russet potatoes	10 lb.	\$ 1.69	\$ 0.17	Plastic bag
Fresh russet potatoes	4 lb.	\$ 1.00	\$ 0.25	Bulk
Canned potatoes—sliced	15 oz.	\$.75	\$ 0.80	Can (steel)
Canned potatoes—whole	15 oz.	\$.75	\$ 0.80	Can (steel)
Tater tots—frozen	32 oz.	\$ 2.85	\$ 1.43	Plastic bag
Tater tots—frozen	5 lb.	\$ 5.55	\$ 1.11	Plastic bag
Mashed potatoes—frozen	22 oz.	\$ 2.39	\$ 1.74	Plastic bag
Hash brown patties—frozen	24 oz.	\$ 2.39	\$ 1.60	Cardboard box
Hash browns (southern style)—frozen	32 oz.	\$ 2.79	\$ 1.40	Plastic bag
French fries (crinkles)—frozen	32 oz.	\$2.75	\$ 1.38	Plastic bag
Shoestrings potatoes—frozen	20 oz.	\$ 2.17	\$ 1.74	Plastic bag
Potato chips	9 oz.	\$ 2.09	\$ 3.72	Plastic bag
Potato chips	14 oz.	\$ 2.99	\$ 3.42	Plastic bag
Instant mashed potato buds	5.5 oz.	\$.99	\$ 2.88	Cardboard box
Instant mashed potato buds	13.75 oz.	\$ 2.45	\$ 2.85	Cardboard box
Instant mashed potato buds	1 lb. 12 oz.	\$ 3.75	\$ 2.14	Cardboard box
		\$	\$	
		\$	\$	
		\$	\$	

1 lb. = 16 oz.

¹Prices gathered in Lakeport, California on July 25, 1997.

A SPUD BY ANY OTHER NAME 2

Product	Package size	Price	Price/pound (lb.) ¹	How packaged
Fresh russet potatoes	5 lb.	\$.99		Plastic bag
Fresh russet potatoes	10 lb.	\$ 1.69		Plastic bag
Fresh russet potatoes	4 lb.	\$ 1.00		Bulk
Canned potatoes—sliced	15 oz.	\$.75		Can (steel)
Canned potatoes—whole	15 oz.	\$.75		Can (steel)
Tater tots—frozen	32 oz.	\$ 2.85		Plastic bag
Tater tots—frozen	5 lb.	\$ 5.55		Plastic bag
Mashed potatoes—frozen	22 oz.	\$ 2.39		Plastic bag
Hash brown patties—frozen	24 oz.	\$ 2.39		Cardboard box
Hash browns (southern style)—frozen	32 oz.	\$ 2.79		Plastic bag
French fries (crinkles)—frozen	32 oz.	\$2.75		Plastic bag
Shoestrings potatoes—frozen	20 oz.	\$ 2.17		Plastic bag
Potato chips	9 oz.	\$ 2.09		Plastic bag
Potato chips	14 oz.	\$ 2.99		Plastic bag
Instant mashed potato buds	5.5 oz.	\$.99		Cardboard box
Instant mashed potato buds	13.75 oz.	\$ 2.45		Cardboard box
Instant mashed potato buds	1 lb. 12 oz.	\$ 3.75		Cardboard box
		\$		
		\$		
		\$		

1 lb. = 16 oz.

ANALYZING THE COST AND PACKAGING OF A PRODUCT

Product	Package size	Price	Price/pound (lb).	How packaged
1.		\$	\$	
2.		\$	\$	
3.		\$	\$	
4.		\$	\$	
5.		\$	\$	
6.		\$	\$	

BACKGROUND INFORMATION FOR THE TEACHER

There are many influences on what children buy—family food buying practices (e.g., buying fast foods, processed foods, frozen foods, fresh foods), advertising, packaging, socioeconomic factors, convenience, education, and beliefs. If children are to become responsible shoppers, there are many factors they should consider when they shop: (1) What kind of packaging does the food have? Is it necessary? Is it reusable? Is it recyclable? (2) What types of natural resources are consumed to create the packaging? Can these resources be recovered through reuse or recycling? and (3) What are the differences in the overall cost of foods? Food costs include such considerations as the amount of food in each package, the amount of packaging, and the comparative cost of disposing of waste versus reusing or recycling the package. Minimizing packaging material can make a big difference in the amount of solid waste that is produced.

At an early age children need to understand that when they buy something, they also buy the packaging. As responsible citizens they should see that the packaging of the products they buy is minimal, that it does not become litter, and that it is reused or recycled, if possible. If it is waste, they need to know how and where to dispose of it properly.

Packaging protects the contents from physical damage and spoilage and may also be used to ensure that the contents are sanitary. Labels on packaging identify contents and provide directions for use. Packaging may help retailers advertise their goods, keep sales records straight, and discourage theft. Packaging also provides consumer convenience.

By reducing spoilage and damage and by dividing food and beverages into individualized portions, packaging can actually reduce the volume of solid waste, because less food would be thrown away. Unfortunately, packaging also

contributes substantially to the volume of solid waste needing disposal, depletes natural resources, adds to litter and pollution, and increases the cost of a product. Most packaging is meant to be disposed after one use. Some packaging materials contribute nonbiodegradable or toxic materials to the environment. Most litter is packaging and includes cans, bottle, paper wrappers, and bags. This type of litter has adverse effects on tourism and may also harm or kill wildlife.

In the United States, packaging accounts for 50 percent of all paper produced, 90 percent of all glass, 11 percent of all aluminum, and 3 percent of all energy used. Packaging makes up about 50 percent by volume and 30 percent by weight of municipal solid waste.²

Excessive packaging typically increases the cost of products. If consumers can relate their purchase costs to the amount of waste generated by packaging, they will realize they can save money by purchasing products with less packaging and buying products in bulk.

Packaging's manufacturing, distribution, and retail process generally fails to account for the cost of package disposal. Since this cost is not included in the cost of the product, the product sells for less than it would if the cost for disposal were included. However, consumers do eventually pay for the costs associated with package disposal in the form of higher fees for garbage collection, landfill and incinerator operations, and the clean up of litter. Without reusing or recycling packaging materials, the energy and natural resources that go into packaging are buried in landfills.

For more information on packaging, see "Appendix B-II, Waste Prevention."

²G. Tyler Miller, Jr. *Environmental Science: Working with the Earth* (Fifth edition). Belmont, Calif.: Wadsworth Publishing Company, 1995, p. 340.

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